

SEQUENCE LISTING

<110> Carozzi, Nadine
Hargiss, Tracy
Koziel, Michael G.
Duck, Nicholas B.
Carr, Brian

<120> AXMI-004, A Delta-Endotoxin Gene and
Methods for Its Use

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<150> 60/448,810

<151> 2003-02-20

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<213> *Bacillus thuringiensis*

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<212> DNA

<213> *Bacillus thuringiensis*

<220>

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<222> (1)...(1890)

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tgt ttg cta aaa ata ata aat ata gga gga aga ggt atg aat tca aag 96
Cys Leu Leu Lys Ile Ile Asn Ile Gly Gly Arg Gly Met Asn Ser Lys
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gaa cat gat tat cta aaa gtt tgt aat gat tta agt gac gcc aat att 144
Glu His Asp Tyr Leu Lys Val Cys Asn Asp Leu Ser Asp Ala Asn Ile
35 40 45

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aat atg gaa cgg ttt gat aag aat gat gca ctg gaa att ggt atg tcc 192
Asn Met Glu Arg Phe Asp Lys Asn Asp Ala Leu Glu Ile Gly Met Ser
50 55 60

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att gta tct gaa ctt att ggt atg att cca ggc gga aca gct ttg caa 240
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65 70 75 80

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ttt gtg ttt aat caa ttg tgg tct cgt tta ggt gat tct gga tgg aat 288
Phe Val Phe Asn Gln Leu Trp Ser Arg Leu Gly Asp Ser Gly Trp Asn
85 90 95

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gcg ttc atg gaa cat gtg gag gaa tta att gat act aaa ata gaa ggg 336
Ala Phe Met Glu His Val Glu Glu Leu Ile Asp Thr Lys Ile Glu Gly
100 105 110

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tat gca aaa aat aaa gcc tta tct gaa tta gca ggt ata caa aga aac 384
Tyr Ala Lys Asn Lys Ala Leu Ser Glu Leu Ala Gly Ile Gln Arg Asn
115 120 125

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ctt gaa aca tat ata caa tta cgt aat gaa tgg gaa aat gat att gaa 432
Leu Glu Thr Tyr Ile Gln Leu Arg Asn Glu Trp Glu Asn Asp Ile Glu
130 135 140

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Gln Ala Val Glu Arg Ser Met Pro Gln Phe Ala Val Glu Asn Phe Glu	
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gta cca ctt tta act gtc tat gtg caa gct gct aat ctt cat tta tta	576
Val Pro Leu Leu Thr Val Tyr Val Gln Ala Ala Asn Leu His Leu Leu	
180 185 190	
tta tta aga gat gtt tca gtt tat gga aag tgt tgg gga tgg tcg gag	624
Leu Leu Arg Asp Val Ser Val Tyr Gly Lys Cys Trp Gly Trp Ser Glu	
195 200 205	
cag aaa att aaa att tat tat gat aaa cag att aag tat acc cat gaa	672
Gln Lys Ile Lys Ile Tyr Tyr Asp Lys Gln Ile Lys Tyr Thr His Glu	
210 215 220	
tac aca aat cat tgt gta aat tgg tat aat aaa gga ctt gag aga tta	720
Tyr Thr Asn His Cys Val Asn Trp Tyr Asn Lys Gly Leu Glu Arg Leu	
225 230 235 240	
aaa aat aaa ggt tct tct tat caa gat tgg tac aat tat aat cgt ttc	768
Lys Asn Lys Gly Ser Ser Tyr Gln Asp Trp Tyr Asn Tyr Asn Arg Phe	
245 250 255	
cgt aga gaa atg act ctt act gtt tta gat atc gtt gct tta ttc ccg	816
Arg Arg Glu Met Thr Leu Thr Val Leu Asp Ile Val Ala Leu Phe Pro	
260 265 270	
cac tat gat gta caa act tat cca ata aca acc gtt gct cag cta aca	864
His Tyr Asp Val Gln Thr Tyr Pro Ile Thr Thr Val Ala Gln Leu Thr	
275 280 285	
agg gaa gtt tat acg gat cct tta ctt aat ttt aat cct aaa tta cat	912
Arg Glu Val Tyr Thr Asp Pro Leu Leu Asn Phe Asn Pro Lys Leu His	
290 295 300	
tct gtg tct caa tta cct agt ttt agt gac atg gaa aat gca aca att	960
Ser Val Ser Gln Leu Pro Ser Phe Ser Asp Met Glu Asn Ala Thr Ile	
305 310 315 320	
aga act cca cat ctg atg gaa ttt tta aga atg cta aca att tat aca	1008
Arg Thr Pro His Leu Met Glu Phe Leu Arg Met Leu Thr Ile Tyr Thr	
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Asp Trp Tyr Ser Val Gly Arg Asn Tyr Tyr Trp Gly Gly His Arg Val	
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acg tct tac cat gta gga gga gag aat ata aga tca cct cta tat ggt	1104
Thr Ser Tyr His Val Gly Gly Glu Asn Ile Arg Ser Pro Leu Tyr Gly	
355 360 365	
aga gag gca aat caa gag gtt cct aga gat ttt tat ttt tat gga ccc	1152

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Val	Phe	Lys	Thr	Leu	Ser	Lys	Pro	Thr	Leu	Arg	Pro	Leu	Gln	Gln	Pro		
385					390					395					400		
gca	cca	gct	cct	cct	ttt	aat	tta	cgt	agc	tta	gag	gga	gta	gaa	ttc	1248	
Ala	Pro	Ala	Pro	Pro	Phe	Asn	Leu	Arg	Ser	Leu	Glu	Gly	Val	Glu	Phe		
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cac	act	cct	aca	ggg	agt	ttt	atg	tat	cgt	gaa	aga	gga	tcg	gta	gat	1296	
His	Thr	Pro	Thr	Gly	Ser	Phe	Met	Tyr	Arg	Glu	Arg	Gly	Ser	Val	Asp		
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Ser	Phe	Asn	Glu	Leu	Pro	Pro	Phe	Asn	Pro	Val	Gly	Leu	Pro	His	Lys		
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acc	cct	tat	tta	aca	aca	ggg	gcc	atc	ttt	tct	tgg	aca	cat	cgt	agt	1440	
Thr	Pro	Tyr	Leu	Thr	Thr	Gly	Ala	Ile	Phe	Ser	Trp	Thr	His	Arg	Ser		
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Pro	Gly	Phe	Thr	Gly	Gly	Asp	Ile	Leu	Arg	Arg	Thr	Gly	Pro	Gly	Thr		
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Arg	Val	Arg	Ile	Arg	Tyr	Ala	Ser	Thr	Thr	Asp	Leu	Gln	Phe	Val	Thr		
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agt	att	aat	ggg	acc	acc	att	aat	att	ggg	aac	ttc	ccg	aaa	act	att	1728	
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35 40 45			
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Phe Val Phe Asn Gln Leu Trp Ser Arg Leu Gly Asp Ser Gly Trp Asn			
85 90 95			
Ala Phe Met Glu His Val Glu Glu Leu Ile Asp Thr Lys Ile Glu Gly			
100 105 110			
Tyr Ala Lys Asn Lys Ala Leu Ser Glu Leu Ala Gly Ile Gln Arg Asn			
115 120 125			
Leu Glu Thr Tyr Ile Gln Leu Arg Asn Glu Trp Glu Asn Asp Ile Glu			
130 135 140			
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Gln Lys Ile Lys Ile Tyr Tyr Asp Lys Gln Ile Lys Tyr Thr His Glu			
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Tyr Thr Asn His Cys Val Asn Trp Tyr Asn Lys Gly Leu Glu Arg Leu			
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His Tyr Asp Val Gln Thr Tyr Pro Ile Thr Thr Val Ala Gln Leu Thr			
275 280 285			
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Ser Val Ser Gln Leu Pro Ser Phe Ser Asp Met Glu Asn Ala Thr Ile			
305 310 315 320			

Arg Thr Pro His Leu Met Glu Phe Leu Arg Met Leu Thr Ile Tyr Thr
 325 330 335
 Asp Trp Tyr Ser Val Gly Arg Asn Tyr Tyr Trp Gly Gly His Arg Val
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 465 470 475 480
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 Pro Gly Phe Thr Gly Gly Asp Ile Leu Arg Arg Thr Gly Pro Gly Thr
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 Arg Val Arg Ile Arg Tyr Ala Ser Thr Thr Asp Leu Gln Phe Val Thr
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 Ser Ile Asn Gly Thr Thr Ile Asn Ile Gly Asn Phe Pro Lys Thr Ile
 565 570 575
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 580 585 590
 Ser Thr Pro Phe Ser Phe Ser Asn Ala Gln Ser Ile Phe Arg Leu Gly
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<210> 4

<211> 1806

<212> DNA

<213> *Bacillus thuringiensis*

<220>

<221> CDS

<222> (1)...(1806)

<400> 4

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Ile Gly Met Ser Ile Val Ser Glu Leu Ile Gly Met Ile Pro Gly Gly	
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Thr Ala Leu Gln Phe Val Phe Asn Gln Leu Trp Ser Arg Leu Gly Asp	
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tct gga tgg aat gcg ttc atg gaa cat gtg gag gaa tta att gat act	240
Ser Gly Trp Asn Ala Phe Met Glu His Val Glu Glu Leu Ile Asp Thr	
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aaa ata gaa ggg tat gca aaa aat aaa gcc tta tct gaa tta gca ggt	288
Lys Ile Glu Gly Tyr Ala Lys Asn Lys Ala Leu Ser Glu Leu Ala Gly	
85 90 95	
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Ile Gln Arg Asn Leu Glu Thr Tyr Ile Gln Leu Arg Asn Glu Trp Glu	
100 105 110	
aat gat att gaa aac tca aag gct caa ggt aag gta gct aat tac tat	384
Asn Asp Ile Glu Asn Ser Lys Ala Gln Gly Lys Val Ala Asn Tyr Tyr	
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Glu Ser Leu Glu Gln Ala Val Glu Arg Ser Met Pro Gln Phe Ala Val	
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Glu Asn Phe Glu Val Pro Leu Leu Thr Val Tyr Val Gln Ala Ala Asn	
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Leu His Leu Leu Leu Leu Arg Asp Val Ser Val Tyr Gly Lys Cys Trp	
165 170 175	
gga tgg tcg gag cag aaa att aaa att tat tat gat aaa cag att aag	576
Gly Trp Ser Glu Gln Lys Ile Lys Ile Tyr Tyr Asp Lys Gln Ile Lys	
180 185 190	
tat acc cat gaa tac aca aat cat tgt gta aat tgg tat aat aaa gga	624
Tyr Thr His Glu Tyr Thr Asn His Cys Val Asn Trp Tyr Asn Lys Gly	
195 200 205	
ctt gag aga tta aaa aat aaa ggt tct tct tat caa gat tgg tac aat	672
Leu Glu Arg Leu Lys Asn Lys Gly Ser Ser Tyr Gln Asp Trp Tyr Asn	
210 215 220	
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Tyr Asn Arg Phe Arg Arg Glu Met Thr Leu Thr Val Leu Asp Ile Val	
225 230 235 240	
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Ala	Gln	Leu	Thr	Arg	Glu	Val	Tyr	Thr	Asp	Pro	Leu	Leu	Asn	Phe	Asn	
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cct	aaa	tta	cat	tct	gtg	tct	caa	tta	cct	agt	ttt	agt	gac	atg	gaa	864
Pro	Lys	Leu	His	Ser	Val	Ser	Gln	Leu	Pro	Ser	Phe	Ser	Asp	Met	Glu	
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Leu	Gln	Gln	Pro	Ala	Pro	Ala	Pro	Pro	Phe	Asn	Leu	Arg	Ser	Leu	Glu	
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Gly	Ser	Val	Asp	Ser	Phe	Asn	Glu	Leu	Pro	Pro	Phe	Asn	Pro	Val	Gly	
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Leu	Pro	His	Lys	Val	Tyr	Ser	His	Arg	Leu	Cys	His	Ala	Thr	Phe	Val	
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cgt	aaa	tct	ggg	acc	cct	tat	tta	aca	aca	ggt	gcc	atc	ttt	tct	tgg	1344
Arg	Lys	Ser	Gly	Thr	Pro	Tyr	Leu	Thr	Thr	Gly	Ala	Ile	Phe	Ser	Trp	
		435					440				445					
aca	cat	cgt	agt	gct	gaa	gaa	acc	aat	aca	att	gaa	tca	aat	att	att	1392
Thr	His	Arg	Ser	Ala	Glu	Glu	Thr	Asn	Thr	Ile	Glu	Ser	Asn	Ile	Ile	
	450					455					460					
acg	caa	atc	ccg	tta	gta	aaa	gca	tat	caa	att	ggg	tca	ggc	act	act	1440
Thr	Gln	Ile	Pro	Leu	Val	Lys	Ala	Tyr	Gln	Ile	Gly	Ser	Gly	Thr	Thr	

465	470	475	480	
gta agg aaa gga cca gga ttc aca gga ggg gat ata ctt cga aga aca				1488
Val Arg Lys Gly Pro Gly Phe Thr Gly Gly Asp Ile Leu Arg Arg Thr	485	490	495	
ggt cct gga aca ttt gga gat atg aga ata aat att aat gca cca tta				1536
Gly Pro Gly Thr Phe Gly Asp Met Arg Ile Asn Ile Asn Ala Pro Leu	500	505	510	
tct caa aga tat cgt gta agg att cgt tat gct tct acg aca gat tta				1584
Ser Gln Arg Tyr Arg Val Arg Ile Arg Tyr Ala Ser Thr Thr Asp Leu	515	520	525	
caa ttt gtc acg agt att aat ggg acc acc att aat att ggt aac ttc				1632
Gln Phe Val Thr Ser Ile Asn Gly Thr Thr Ile Asn Ile Gly Asn Phe	530	535	540	
ccg aaa act att aat aat cta aat act tta ggt tct gag ggc tat aga				1680
Pro Lys Thr Ile Asn Asn Leu Asn Thr Leu Gly Ser Glu Gly Tyr Arg	545	550	555	560
aca gta tcg ttt agt act cca ttt agt ttc tca aat gca caa agc ata				1728
Thr Val Ser Phe Ser Thr Pro Phe Ser Phe Ser Asn Ala Gln Ser Ile	565	570	575	
ttt aga tta ggt ata caa gca ttt tct gga gtt caa gaa gtt tat gtg				1776
Phe Arg Leu Gly Ile Gln Ala Phe Ser Gly Val Gln Glu Val Tyr Val	580	585	590	
gat aaa att gaa ttt att cct gtt gaa tag				1806
Asp Lys Ile Glu Phe Ile Pro Val Glu *	595	600		

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 <213> *Bacillus thuringiensis*

<400> 5

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Asp Ala Asn Ile Asn Met Glu Arg Phe Asp Lys Asn Asp Ala Leu Glu				
	20	25	30	
Ile Gly Met Ser Ile Val Ser Glu Leu Ile Gly Met Ile Pro Gly Gly				
	35	40	45	
Thr Ala Leu Gln Phe Val Phe Asn Gln Leu Trp Ser Arg Leu Gly Asp				
	50	55	60	
Ser Gly Trp Asn Ala Phe Met Glu His Val Glu Leu Ile Asp Thr				
65	70	75	80	
Lys Ile Glu Gly Tyr Ala Lys Asn Lys Ala Leu Ser Glu Leu Ala Gly				
	85	90	95	
Ile Gln Arg Asn Leu Glu Thr Tyr Ile Gln Leu Arg Asn Glu Trp Glu				
	100	105	110	
Asn Asp Ile Glu Asn Ser Lys Ala Gln Gly Lys Val Ala Asn Tyr Tyr				
	115	120	125	

Glu	Ser	Leu	Glu	Gln	Ala	Val	Glu	Arg	Ser	Met	Pro	Gln	Phe	Ala	Val
130						135				140					
Glu	Asn	Phe	Glu	Val	Pro	Leu	Leu	Thr	Val	Tyr	Val	Gln	Ala	Ala	Asn
145					150					155					160
Leu	His	Leu	Leu	Leu	Leu	Arg	Asp	Val	Ser	Val	Tyr	Gly	Lys	Cys	Trp
				165					170					175	
Gly	Trp	Ser	Glu	Gln	Lys	Ile	Lys	Ile	Tyr	Tyr	Asp	Lys	Gln	Ile	Lys
			180					185					190		
Tyr	Thr	His	Glu	Tyr	Thr	Asn	His	Cys	Val	Asn	Trp	Tyr	Asn	Lys	Gly
		195				200					205				
Leu	Glu	Arg	Leu	Lys	Asn	Lys	Gly	Ser	Ser	Tyr	Gln	Asp	Trp	Tyr	Asn
210					215						220				
Tyr	Asn	Arg	Phe	Arg	Arg	Glu	Met	Thr	Leu	Thr	Val	Leu	Asp	Ile	Val
225					230				235						240
Ala	Leu	Phe	Pro	His	Tyr	Asp	Val	Gln	Thr	Tyr	Pro	Ile	Thr	Thr	Val
				245					250					255	
Ala	Gln	Leu	Thr	Arg	Glu	Val	Tyr	Thr	Asp	Pro	Leu	Leu	Asn	Phe	Asn
			260					265					270		
Pro	Lys	Leu	His	Ser	Val	Ser	Gln	Leu	Pro	Ser	Phe	Ser	Asp	Met	Glu
		275					280				285				
Asn	Ala	Thr	Ile	Arg	Thr	Pro	His	Leu	Met	Glu	Phe	Leu	Arg	Met	Leu
290					295					300					
Thr	Ile	Tyr	Thr	Asp	Trp	Tyr	Ser	Val	Gly	Arg	Asn	Tyr	Tyr	Trp	Gly
305					310				315						320
Gly	His	Arg	Val	Thr	Ser	Tyr	His	Val	Gly	Gly	Glu	Asn	Ile	Arg	Ser
				325					330					335	
Pro	Leu	Tyr	Gly	Arg	Glu	Ala	Asn	Gln	Glu	Val	Pro	Arg	Asp	Phe	Tyr
			340					345					350		
Phe	Tyr	Gly	Pro	Val	Phe	Lys	Thr	Leu	Ser	Lys	Pro	Thr	Leu	Arg	Pro
		355					360				365				
Leu	Gln	Gln	Pro	Ala	Pro	Ala	Pro	Pro	Phe	Asn	Leu	Arg	Ser	Leu	Glu
370					375					380					
Gly	Val	Glu	Phe	His	Thr	Pro	Thr	Gly	Ser	Phe	Met	Tyr	Arg	Glu	Arg
385					390					395					400
Gly	Ser	Val	Asp	Ser	Phe	Asn	Glu	Leu	Pro	Pro	Phe	Asn	Pro	Val	Gly
				405					410					415	
Leu	Pro	His	Lys	Val	Tyr	Ser	His	Arg	Leu	Cys	His	Ala	Thr	Phe	Val
			420					425					430		
Arg	Lys	Ser	Gly	Thr	Pro	Tyr	Leu	Thr	Thr	Gly	Ala	Ile	Phe	Ser	Trp
		435					440				445				
Thr	His	Arg	Ser	Ala	Glu	Glu	Thr	Asn	Thr	Ile	Glu	Ser	Asn	Ile	Ile
450					455					460					
Thr	Gln	Ile	Pro	Leu	Val	Lys	Ala	Tyr	Gln	Ile	Gly	Ser	Gly	Thr	Thr
465					470					475					480
Val	Arg	Lys	Gly	Pro	Gly	Phe	Thr	Gly	Gly	Asp	Ile	Leu	Arg	Arg	Thr
				485					490					495	
Gly	Pro	Gly	Thr	Phe	Gly	Asp	Met	Arg	Ile	Asn	Ile	Asn	Ala	Pro	Leu
			500					505					510		
Ser	Gln	Arg	Tyr	Arg	Val	Arg	Ile	Arg	Tyr	Ala	Ser	Thr	Thr	Asp	Leu
		515					520					525			
Gln	Phe	Val	Thr	Ser	Ile	Asn	Gly	Thr	Thr	Ile	Asn	Ile	Gly	Asn	Phe
530					535					540					
Pro	Lys	Thr	Ile	Asn	Asn	Leu	Asn	Thr	Leu	Gly	Ser	Glu	Gly	Tyr	Arg
545					550					555					560
Thr	Val	Ser	Phe	Ser	Thr	Pro	Phe	Ser	Phe	Ser	Asn	Ala	Gln	Ser	Ile
				565					570					575	
Phe	Arg	Leu	Gly	Ile	Gln	Ala	Phe	Ser	Gly	Val	Gln	Glu	Val	Tyr	Val

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Asp	Lys	Ile	Glu	Phe	Ile	Pro	Val	Glu					
		595					600						

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 <213> *Bacillus thuringiensis*

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 Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser
 35 40 45
 Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile
 50 55 60
 Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile
 65 70 75 80
 Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala
 85 90 95
 Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu
 100 105 110
 Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu
 115 120 125
 Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala
 130 135 140
 Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val
 145 150 155 160
 Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser
 165 170 175
 Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg
 180 185 190
 Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val
 195 200 205
 Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg
 210 215 220
 Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val
 225 230 235 240
 Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro
 245 250 255
 Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val
 260 265 270
 Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu
 275 280 285
 Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr
 290 295 300
 Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Trp Ser Gly His Gln
 305 310 315 320
 Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro
 325 330 335
 Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala
 340 345 350
 Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg
 355 360 365

Arg	Pro	Phe	Asn	Ile	Gly	Ile	Asn	Asn	Gln	Gln	Leu	Ser	Val	Leu	Asp
	370					375					380				
Gly	Thr	Glu	Phe	Ala	Tyr	Gly	Thr	Ser	Ser	Asn	Leu	Pro	Ser	Ala	Val
385					390					395					400
Tyr	Arg	Lys	Ser	Gly	Thr	Val	Asp	Ser	Leu	Asp	Glu	Ile	Pro	Pro	Gln
			405						410					415	
Asn	Asn	Asn	Val	Pro	Pro	Arg	Gln	Gly	Phe	Ser	His	Arg	Leu	Ser	His
			420					425					430		
Val	Ser	Met	Phe	Arg	Ser	Gly	Phe	Ser	Asn	Ser	Ser	Val	Ser	Ile	Ile
		435					440					445			
Arg	Ala	Pro	Met	Phe	Ser	Trp	Ile	His	Arg	Ser	Ala	Glu	Phe	Asn	Asn
	450					455					460				
Ile	Ile	Ala	Ser	Asp	Ser	Ile	Thr	Gln	Ile	Pro	Ala	Val	Lys	Gly	Asn
465					470					475					480
Phe	Leu	Phe	Asn	Gly	Ser	Val	Ile	Ser	Gly	Pro	Gly	Phe	Thr	Gly	Gly
			485						490					495	
Asp	Leu	Val	Arg	Leu	Asn	Ser	Ser	Gly	Asn	Asn	Ile	Gln	Asn	Arg	Gly
			500					505				510			
Tyr	Ile	Glu	Val	Pro	Ile	His	Phe	Pro	Ser	Thr	Ser	Thr	Arg	Tyr	Arg
		515					520					525			
Val	Arg	Val	Arg	Tyr	Ala	Ser	Val	Thr	Pro	Ile	His	Leu	Asn	Val	Asn
	530				535						540				
Trp	Gly	Asn	Ser	Ser	Ile	Phe	Ser	Asn	Thr	Val	Pro	Ala	Thr	Ala	Thr
545					550					555					560
Ser	Leu	Asp	Asn	Leu	Gln	Ser	Ser	Asp	Phe	Gly	Tyr	Phe	Glu	Ser	Ala
			565						570					575	
Asn	Ala	Phe	Thr	Ser	Ser	Leu	Gly	Asn	Ile	Val	Gly	Val	Arg	Asn	Phe
			580					585					590		
Ser	Gly	Thr	Ala	Gly	Val	Ile	Ile	Asp	Arg	Phe	Glu	Phe	Ile	Pro	Val
		595					600					605			
Thr	Ala	Thr	Leu	Glu	Ala	Glu	Tyr	Asn	Leu	Glu	Arg	Ala	Gln	Lys	Ala
	610					615					620				
Val	Asn	Ala	Leu	Phe	Thr	Ser	Thr	Asn	Gln	Leu	Gly	Leu	Lys	Thr	Asn
625					630					635					640
Val	Thr	Asp	Tyr	His	Ile	Asp	Gln	Val	Ser	Asn	Leu	Val	Thr	Tyr	Leu
				645					650					655	
Ser	Asp	Glu	Phe	Cys	Leu	Asp	Glu	Lys	Arg	Glu	Leu	Ser	Glu	Lys	Val
			660					665					670		
Lys	His	Ala	Lys	Arg	Leu	Ser	Asp	Glu	Arg	Asn	Leu	Leu	Gln	Asp	Ser
		675					680					685			
Asn	Phe	Lys	Asp	Ile	Asn	Arg	Gln	Pro	Glu	Arg	Gly	Trp	Gly	Gly	Ser
	690					695					700				
Thr	Gly	Ile	Thr	Ile	Gln	Gly	Gly	Asp	Asp	Val	Phe	Lys	Glu	Asn	Tyr
705					710					715					720
Val	Thr	Leu	Ser	Gly	Thr	Phe	Asp	Glu	Cys	Tyr	Pro	Thr	Tyr	Leu	Tyr
			725						730					735	
Gln	Lys	Ile	Asp	Glu	Ser	Lys	Leu	Lys	Ala	Phe	Thr	Arg	Tyr	Gln	Leu
			740					745					750		
Arg	Gly	Tyr	Ile	Glu	Asp	Ser	Gln	Asp	Leu	Glu	Ile	Tyr	Leu	Ile	Arg
		755					760					765			
Tyr	Asn	Ala	Lys	His	Glu	Thr	Val	Asn	Val	Pro	Gly	Thr	Gly	Ser	Leu
	770					775					780				
Trp	Pro	Leu	Ser	Ala	Gln	Ser	Pro	Ile	Gly	Lys	Cys	Gly	Glu	Pro	Asn
785					790					795					800
Arg	Cys	Ala	Pro	His	Leu	Glu	Trp	Asn	Pro	Asp	Leu	Asp	Cys	Ser	Cys
				805					810					815	
Arg	Asp	Gly	Glu	Lys	Cys	Ala	His	His	Ser	His	His	Phe	Ser	Leu	Asp

Ile	Asp	Val	Gly	Cys	Thr	Asp	Leu	Asn	Glu	Asp	Leu	Gly	Val	Trp	Val
		820						825					830		
Ile	Phe	Lys	Ile	Lys	Thr	Gln	Asp	Gly	His	Ala	Arg	Leu	Gly	Asn	Leu
		835					840					845			
Glu	Phe	Leu	Glu	Glu	Lys	Pro	Leu	Val	Gly	Glu	Ala	Leu	Ala	Arg	Val
		850				855					860				
Lys	Arg	Ala	Glu	Lys	Lys	Trp	Arg	Asp	Lys	Arg	Glu	Lys	Leu	Glu	Trp
				885					890					895	
Glu	Thr	Asn	Ile	Val	Tyr	Lys	Glu	Ala	Lys	Glu	Ser	Val	Asp	Ala	Leu
		900						905					910		
Phe	Val	Asn	Ser	Gln	Tyr	Asp	Gln	Leu	Gln	Ala	Asp	Thr	Asn	Ile	Ala
		915					920					925			
Met	Ile	His	Ala	Ala	Asp	Lys	Arg	Val	His	Ser	Ile	Arg	Glu	Ala	Tyr
		930				935					940				
Leu	Pro	Glu	Leu	Ser	Val	Ile	Pro	Gly	Val	Asn	Ala	Ala	Ile	Phe	Glu
		945				950				955					960
Glu	Leu	Glu	Gly	Arg	Ile	Phe	Thr	Ala	Phe	Ser	Leu	Tyr	Asp	Ala	Arg
				965					970					975	
Asn	Val	Ile	Lys	Asn	Gly	Asp	Phe	Asn	Asn	Gly	Leu	Ser	Cys	Trp	Asn
			980					985					990		
Val	Lys	Gly	His	Val	Asp	Val	Glu	Glu	Gln	Asn	Asn	Gln	Arg	Ser	Val
		995					1000					1005			
Leu	Val	Val	Pro	Glu	Trp	Glu	Ala	Glu	Val	Ser	Gln	Glu	Val	Arg	Val
		1010					1015				1020				
Cys	Pro	Gly	Arg	Gly	Tyr	Ile	Leu	Arg	Val	Thr	Ala	Tyr	Lys	Glu	Gly
		1025				1030					1035				1040
Tyr	Gly	Glu	Gly	Cys	Val	Thr	Ile	His	Glu	Ile	Glu	Asn	Asn	Thr	Asp
				1045					1050					1055	
Glu	Leu	Lys	Phe	Ser	Asn	Cys	Val	Glu	Glu	Glu	Ile	Tyr	Pro	Asn	Asn
			1060					1065					1070		
Thr	Val	Thr	Cys	Asn	Asp	Tyr	Thr	Val	Asn	Gln	Glu	Glu	Tyr	Gly	Gly
		1075					1080					1085			
Ala	Tyr	Thr	Ser	Arg	Asn	Arg	Gly	Tyr	Asn	Glu	Ala	Pro	Ser	Val	Pro
		1090				1095					1100				
Ala	Asp	Tyr	Ala	Ser	Val	Tyr	Glu	Glu	Lys	Ser	Tyr	Thr	Asp	Gly	Arg
		1105				1110				1115				1120	
Arg	Glu	Asn	Pro	Cys	Glu	Phe	Asn	Arg	Gly	Tyr	Arg	Asp	Tyr	Thr	Pro
				1125					1130					1135	
Leu	Pro	Val	Gly	Tyr	Val	Thr	Lys	Glu	Leu	Glu	Tyr	Phe	Pro	Glu	Thr
			1140					1145				1150			
Asp	Lys	Val	Trp	Ile	Glu	Ile	Gly	Glu	Thr	Glu	Gly	Thr	Phe	Ile	Val
		1155					1160					1165			
Asp	Ser	Val	Glu	Leu	Leu	Leu	Met	Glu	Glu						
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 Asn Pro Glu Glu Val Leu Leu Asp Gly Glu Arg Ile Ser Thr Gly Asn
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Ser	Ser	Ile	Asp	Ile	Ser	Leu	Ser	Leu	Val	Gln	Phe	Leu	Val	Ser	Asn
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Phe	Val	Pro	Gly	Gly	Gly	Phe	Leu	Val	Gly	Leu	Ile	Asp	Phe	Val	Trp
	50					55					60				
Gly	Ile	Val	Gly	Pro	Ser	Gln	Trp	Asp	Ala	Phe	Leu	Val	Gln	Ile	Glu
65					70				75					80	
Gln	Leu	Ile	Asn	Glu	Arg	Ile	Ala	Glu	Phe	Ala	Arg	Asn	Ala	Ala	Ile
			85						90					95	
Ala	Asn	Leu	Glu	Gly	Leu	Gly	Asn	Asn	Phe	Asn	Ile	Tyr	Val	Glu	Ala
		100						105					110		
Phe	Lys	Glu	Trp	Glu	Glu	Asp	Pro	Asn	Asn	Pro	Ala	Thr	Arg	Thr	Arg
	115						120					125			
Val	Ile	Asp	Arg	Phe	Arg	Ile	Leu	Asp	Gly	Leu	Leu	Glu	Arg	Asp	Ile
	130					135					140				
Pro	Ser	Phe	Arg	Ile	Ser	Gly	Phe	Glu	Val	Pro	Leu	Leu	Ser	Val	Tyr
145					150					155					160
Ala	Gln	Ala	Ala	Asn	Leu	His	Leu	Ala	Ile	Leu	Arg	Asp	Ser	Val	Ile
				165					170					175	
Phe	Gly	Glu	Arg	Trp	Gly	Leu	Thr	Thr	Ile	Asn	Val	Asn	Glu	Asn	Tyr
		180						185					190		
Asn	Arg	Leu	Ile	Arg	His	Ile	Asp	Glu	Tyr	Ala	Asp	His	Cys	Ala	Asn
	195						200					205			
Thr	Tyr	Asn	Arg	Gly	Leu	Asn	Asn	Leu	Pro	Lys	Ser	Thr	Tyr	Gln	Asp
	210					215					220				
Trp	Ile	Thr	Tyr	Asn	Arg	Leu	Arg	Arg	Asp	Leu	Thr	Leu	Thr	Val	Leu
225					230					235					240
Asp	Ile	Ala	Ala	Phe	Phe	Pro	Asn	Tyr	Asp	Asn	Arg	Arg	Tyr	Pro	Ile
				245					250					255	
Gln	Pro	Val	Gly	Gln	Leu	Thr	Arg	Glu	Val	Tyr	Thr	Asp	Pro	Leu	Ile
		260						265					270		
Asn	Phe	Asn	Pro	Gln	Leu	Gln	Ser	Val	Ala	Gln	Leu	Pro	Thr	Phe	Asn
	275						280					285			
Val	Met	Glu	Ser	Ser	Ala	Ile	Arg	Asn	Pro	His	Leu	Phe	Asp	Ile	Leu
	290					295					300				
Asn	Asn	Leu	Thr	Ile	Phe	Thr	Asp	Trp	Phe	Ser	Val	Gly	Arg	Asn	Phe
305					310					315					320
Tyr	Trp	Gly	Gly	His	Arg	Val	Ile	Ser	Ser	Leu	Ile	Gly	Gly	Gly	Asn
				325					330					335	
Ile	Thr	Ser	Pro	Ile	Tyr	Gly	Arg	Glu	Ala	Asn	Gln	Glu	Pro	Pro	Arg
		340						345					350		
Ser	Phe	Thr	Phe	Asn	Gly	Pro	Val	Phe	Arg	Thr	Leu	Ser	Asn	Pro	Thr
	355						360					365			
Leu	Arg	Leu	Leu	Gln	Gln	Pro	Trp	Pro	Ala	Pro	Pro	Phe	Asn	Leu	Arg
	370					375					380				
Gly	Val	Glu	Gly	Val	Glu	Phe	Ser	Thr	Pro	Thr	Asn	Ser	Phe	Thr	Tyr
385					390					395					400
Arg	Gly	Arg	Gly	Thr	Val	Asp	Ser	Leu	Thr	Glu	Leu	Pro	Pro	Glu	Asp
				405					410					415	
Asn	Ser	Val	Pro	Pro	Arg	Glu	Gly	Tyr	Ser	His	Arg	Leu	Cys	His	Ala
		420						425					430		
Thr	Phe	Val	Gln	Arg	Ser	Gly	Thr	Pro	Phe	Leu	Thr	Thr	Gly	Val	Val
	435					440						445			
Phe	Ser	Trp	Thr	His	Arg	Ser	Ala	Thr	Leu	Thr	Asn	Thr	Ile	Asp	Pro
	450					455					460				
Glu	Arg	Ile	Asn	Gln	Ile	Pro	Leu	Val	Lys	Gly	Phe	Arg	Val	Trp	Gly
465					470					475					480
Gly	Thr	Ser	Val	Ile	Thr	Gly	Pro	Gly	Phe	Thr	Gly	Gly	Asp	Ile	Leu

Arg	Arg	Asn	Thr	485	Phe	Gly	Asp	Phe	Val	490	Ser	Leu	Gln	Val	Asn	Ile	Asn	495
			500						505						510			
Ser	Pro	Ile	Thr	Gln	Arg	Tyr	Arg	Leu	Arg	Phe	Arg	Tyr	Ala	Ser	Ser			
		515					520						525					
Arg	Asp	Ala	Arg	Val	Ile	Val	Leu	Thr	Gly	Ala	Ala	Ser	Thr	Gly	Val			
	530					535						540						
Gly	Gly	Gln	Val	Ser	Val	Asn	Met	Pro	Leu	Gln	Lys	Thr	Met	Glu	Ile			
545					550					555					560			
Gly	Glu	Asn	Leu	Thr	Ser	Arg	Thr	Phe	Arg	Tyr	Thr	Asp	Phe	Ser	Asn			
				565					570						575			
Pro	Phe	Ser	Phe	Arg	Ala	Asn	Pro	Asp	Ile	Ile	Gly	Ile	Ser	Glu	Gln			
			580					585						590				
Pro	Leu	Phe	Gly	Ala	Gly	Ser	Ile	Ser	Ser	Gly	Glu	Leu	Tyr	Ile	Asp			
		595					600						605					
Lys	Ile	Glu	Ile	Ile	Leu	Ala	Asp	Ala	Thr	Phe	Glu	Ala	Glu	Ser	Asp			
	610					615						620						
Leu	Glu	Arg	Ala	Gln	Lys	Ala	Val	Asn	Ala	Leu	Phe	Thr	Ser	Ser	Asn			
625					630					635					640			
Gln	Ile	Gly	Leu	Lys	Thr	Asp	Val	Thr	Asp	Tyr	His	Ile	Asp	Gln	Val			
				645					650					655				
Ser	Asn	Leu	Val	Asp	Cys	Leu	Ser	Asp	Glu	Phe	Cys	Leu	Asp	Glu	Lys			
			660					665						670				
Arg	Glu	Leu	Ser	Glu	Lys	Val	Lys	His	Ala	Lys	Arg	Leu	Ser	Asp	Glu			
		675					680							685				
Arg	Asn	Leu	Leu	Gln	Asp	Pro	Asn	Phe	Arg	Gly	Ile	Asn	Arg	Gln	Pro			
	690					695						700						
Asp	Arg	Gly	Trp	Arg	Gly	Ser	Thr	Asp	Ile	Thr	Ile	Gln	Gly	Gly	Asp			
705					710					715				720				
Asp	Val	Phe	Lys	Glu	Asn	Tyr	Val	Thr	Leu	Pro	Gly	Thr	Val	Asp	Glu			
				725					730					735				
Cys	Tyr	Pro	Thr	Tyr	Leu	Tyr	Gln	Lys	Ile	Asp	Glu	Ser	Lys	Leu	Lys			
			740					745						750				
Ala	Tyr	Thr	Arg	Tyr	Glu	Leu	Arg	Gly	Tyr	Ile	Glu	Asp	Ser	Gln	Asp			
		755					760							765				
Leu	Glu	Ile	Tyr	Leu	Ile	Arg	Tyr	Asn	Ala	Lys	His	Glu	Ile	Val	Asn			
	770					775						780						
Val	Pro	Gly	Thr	Gly	Ser	Leu	Trp	Pro	Leu	Ser	Ala	Gln	Ser	Pro	Ile			
785					790					795					800			
Gly	Lys	Cys	Gly	Glu	Pro	Asn	Arg	Cys	Ala	Pro	His	Leu	Glu	Trp	Asn			
				805					810					815				
Pro	Asp	Leu	Asp	Cys	Ser	Cys	Arg	Asp	Gly	Glu	Lys	Cys	Ala	His	His			
			820					825						830				
Ser	His	His	Phe	Thr	Leu	Asp	Ile	Asp	Val	Gly	Cys	Thr	Asp	Leu	Asn			
		835					840							845				
Glu	Asp	Leu	Gly	Val	Trp	Val	Ile	Phe	Lys	Ile	Lys	Thr	Gln	Asp	Gly			
	850					855						860						
His	Ala	Arg	Leu	Gly	Asn	Leu	Glu	Phe	Leu	Glu	Lys	Pro	Leu	Leu				
865					870					875				880				
Gly	Glu	Ala	Leu	Ala	Arg	Val	Lys	Arg	Ala	Glu	Lys	Lys	Trp	Arg	Asp			
				885					890					895				
Lys	Arg	Glu	Lys	Leu	Gln	Leu	Glu	Thr	Asn	Ile	Val	Tyr	Lys	Glu	Ala			
			900					905						910				
Lys	Glu	Ser	Val	Asp	Ala	Leu	Phe	Val	Asn	Ser	Gln	Tyr	Asp	Arg	Leu			
		915					920							925				
Gln	Val	Asp	Thr	Asn	Ile	Ala	Met	Ile	His	Ala	Ala	Asp	Lys	Arg	Val			
	930					935						940						

His Arg Ile Arg Glu Ala Tyr Leu Pro Glu Leu Ser Val Ile Pro Gly
 945 950 955 960
 Val Asn Ala Ala Ile Phe Glu Glu Leu Glu Gly Arg Ile Phe Thr Ala
 965 970 975
 Tyr Ser Leu Tyr Asp Ala Arg Asn Val Ile Lys Asn Gly Asp Phe Asn
 980 985 990
 Asn Gly Leu Leu Cys Trp Asn Val Lys Gly His Val Asp Val Glu Glu
 995 1000 1005
 Gln Asn Asn His Arg Ser Val Leu Val Ile Pro Glu Trp Glu Ala Glu
 1010 1015 1020
 Val Ser Gln Glu Val Arg Val Cys Pro Gly Arg Gly Tyr Ile Leu Arg
 1025 1030 1035 1040
 Val Thr Ala Tyr Lys Glu Gly Tyr Gly Glu Gly Cys Val Thr Ile His
 1045 1050 1055
 Glu Ile Glu Asp Asn Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu
 1060 1065 1070
 Glu Glu Val Tyr Pro Asn Asn Thr Val Thr Cys Asn Asn Tyr Thr Gly
 1075 1080 1085
 Thr Gln Glu Glu Tyr Glu Gly Thr Tyr Thr Ser Arg Asn Gln Gly Tyr
 1090 1095 1100
 Asp Glu Ala Tyr Gly Asn Asn Pro Ser Val Pro Ala Asp Tyr Ala Ser
 1105 1110 1115 1120
 Val Tyr Glu Glu Lys Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys
 1125 1130 1135
 Glu Ser Asn Arg Gly Tyr Gly Asp Tyr Thr Pro Leu Pro Ala Gly Tyr
 1140 1145 1150
 Val Thr Lys Asp Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile
 1155 1160 1165
 Glu Ile Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser Val Glu Leu
 1170 1175 1180
 Leu Leu Met Glu Glu
 1185

<210> 8
 <211> 633
 <212> PRT
 <213> *Bacillus thuringiensis*

<400> 8
 Met Asn Asn Val Leu Asn Ser Gly Arg Thr Thr Ile Cys Asp Ala Tyr
 1 5 10 15
 Asn Val Val Ala His Asp Pro Phe Ser Phe Glu His Lys Ser Leu Asp
 20 25 30
 Thr Ile Gln Lys Glu Trp Met Glu Trp Lys Arg Thr Asp His Ser Leu
 35 40 45
 Tyr Val Ala Pro Val Val Gly Thr Val Ser Ser Phe Leu Leu Lys Lys
 50 55 60
 Val Gly Ser Leu Ile Gly Lys Arg Ile Leu Ser Glu Leu Trp Gly Ile
 65 70 75 80
 Ile Phe Pro Ser Gly Ser Thr Asn Leu Met Gln Asp Ile Leu Arg Glu
 85 90 95
 Thr Glu Gln Phe Leu Asn Gln Arg Leu Asn Thr Asp Thr Leu Ala Arg
 100 105 110
 Val Asn Ala Glu Leu Ile Gly Leu Gln Ala Asn Ile Arg Glu Phe Asn
 115 120 125
 Gln Gln Val Asp Asn Phe Leu Asn Pro Thr Gln Asn Pro Val Pro Leu

Gly Asn Ile Val Ala Ser Asp Asn Thr Asn Val Thr Leu Asp Ile Asn
595 600 605
Val Thr Leu Asn Ser Gly Thr Pro Phe Asp Leu Met Asn Ile Met Phe
610 615 620
Val Pro Thr Asn Leu Pro Pro Leu Tyr
625 630

<210> 9
<211> 652
<212> PRT
<213> *Bacillus thuringiensis*

<400> 9
Met Ile Arg Lys Gly Gly Arg Lys Met Asn Pro Asn Asn Arg Ser Glu
1 5 10 15
His Asp Thr Ile Lys Thr Thr Glu Asn Asn Glu Val Pro Thr Asn His
20 25 30
Val Gln Tyr Pro Leu Ala Glu Thr Pro Asn Pro Thr Leu Glu Asp Leu
35 40 45
Asn Tyr Lys Glu Phe Leu Arg Met Thr Ala Asp Asn Asn Thr Glu Ala
50 55 60
Leu Asp Ser Ser Thr Thr Lys Asp Val Ile Gln Lys Gly Ile Ser Val
65 70 75 80
Val Gly Asp Leu Leu Gly Val Val Gly Phe Pro Phe Gly Gly Ala Leu
85 90 95
Val Ser Phe Tyr Thr Asn Phe Leu Asn Thr Ile Trp Pro Ser Glu Asp
100 105 110
Pro Trp Lys Ala Phe Met Glu Gln Val Glu Ala Leu Met Asp Gln Lys
115 120 125
Ile Ala Asp Tyr Ala Lys Asn Lys Ala Leu Ala Glu Leu Gln Gly Leu
130 135 140
Gln Asn Asn Val Glu Asp Tyr Val Ser Ala Leu Ser Ser Trp Gln Lys
145 150 155 160
Asn Pro Val Ser Ser Arg Asn Pro His Ser Gln Gly Arg Ile Arg Glu
165 170 175
Leu Phe Ser Gln Ala Glu Ser His Phe Arg Asn Ser Met Pro Ser Phe
180 185 190
Ala Ile Ser Gly Tyr Glu Val Leu Phe Leu Thr Thr Tyr Ala Gln Ala
195 200 205
Ala Asn Thr His Leu Phe Leu Leu Lys Asp Ala Gln Ile Tyr Gly Glu
210 215 220
Glu Trp Gly Tyr Glu Lys Glu Asp Ile Ala Glu Phe Tyr Lys Arg Gln
225 230 235 240
Leu Lys Leu Thr Gln Glu Tyr Thr Asp His Cys Val Lys Trp Tyr Asn
245 250 255
Val Gly Leu Asp Lys Leu Arg Gly Ser Ser Tyr Glu Ser Trp Val Asn
260 265 270
Phe Asn Arg Tyr Arg Arg Glu Met Thr Leu Thr Val Leu Asp Leu Ile
275 280 285
Ala Leu Phe Pro Leu Tyr Asp Val Arg Leu Tyr Pro Lys Glu Val Lys
290 295 300
Thr Glu Leu Thr Arg Asp Val Leu Thr Asp Pro Ile Val Gly Val Asn
305 310 315 320
Asn Leu Arg Gly Tyr Gly Thr Thr Phe Ser Asn Ile Glu Asn Tyr Ile
325 330 335
Arg Lys Pro His Leu Phe Asp Tyr Leu His Arg Ile Gln Phe His Thr

Gln	Val	Ala	Ser	Leu	Tyr	Ser	Phe	Ile	Leu	Gly	Glu	Leu	Trp	Pro	Lys		
				85					90					95			
Gly	Lys	Asn	Gln	Trp	Glu	Ile	Phe	Met	Glu	His	Val	Glu	Glu	Ile	Ile		
			100					105					110				
Asn	Gln	Lys	Ile	Ser	Thr	Tyr	Ala	Arg	Asn	Lys	Ala	Leu	Thr	Asp	Leu		
		115					120					125					
Lys	Gly	Leu	Gly	Asp	Ala	Leu	Ala	Val	Tyr	His	Asp	Ser	Leu	Glu	Ser		
	130					135					140						
Trp	Val	Gly	Asn	Arg	Asn	Asn	Thr	Arg	Ala	Arg	Ser	Val	Val	Lys	Ser		
145					150					155					160		
Gln	Tyr	Ile	Ala	Leu	Glu	Leu	Met	Phe	Val	Gln	Lys	Leu	Pro	Ser	Phe		
				165					170						175		
Ala	Val	Ser	Gly	Glu	Glu	Val	Pro	Leu	Leu	Pro	Ile	Tyr	Ala	Gln	Ala		
			180					185					190				
Ala	Asn	Leu	His	Leu	Leu	Leu	Leu	Arg	Asp	Ala	Ser	Ile	Phe	Gly	Lys		
		195					200					205					
Glu	Trp	Gly	Leu	Ser	Ser	Ser	Glu	Ile	Ser	Thr	Phe	Tyr	Asn	Arg	Gln		
	210					215					220						
Val	Glu	Arg	Ala	Gly	Asp	Tyr	Ser	Asp	His	Cys	Val	Lys	Trp	Tyr	Ser		
225					230					235					240		
Thr	Gly	Leu	Asn	Asn	Leu	Arg	Gly	Thr	Asn	Ala	Glu	Ser	Trp	Val	Arg		
				245					250					255			
Tyr	Asn	Gln	Phe	Arg	Arg	Asp	Met	Thr	Leu	Met	Val	Leu	Asp	Leu	Val		
			260					265					270				
Ala	Leu	Phe	Pro	Ser	Tyr	Asp	Thr	Gln	Met	Tyr	Pro	Ile	Lys	Thr	Thr		
		275					280					285					
Ala	Gln	Leu	Thr	Arg	Glu	Val	Tyr	Thr	Asp	Ala	Ile	Gly	Thr	Val	His		
	290					295					300						
Pro	His	Pro	Ser	Phe	Thr	Ser	Thr	Thr	Trp	Tyr	Asn	Asn	Asn	Ala	Pro		
305					310					315					320		
Ser	Phe	Ser	Ala	Ile	Glu	Ala	Ala	Val	Val	Arg	Asn	Pro	His	Leu	Leu		
				325				330						335			
Asp	Phe	Leu	Glu	Gln	Val	Thr	Ile	Tyr	Ser	Leu	Leu	Ser	Arg	Trp	Ser		
			340					345					350				
Asn	Thr	Gln	Tyr	Met	Asn	Met	Trp	Gly	Gly	His	Lys	Leu	Glu	Phe	Arg		
		355					360					365					
Thr	Ile	Gly	Gly	Thr	Leu	Asn	Ile	Ser	Thr	Gln	Gly	Ser	Thr	Asn	Thr		
	370					375					380						
Ser	Ile	Asn	Pro	Val	Thr	Leu	Pro	Phe	Thr	Ser	Arg	Asp	Val	Tyr	Arg		
385					390					395				400			
Thr	Glu	Ser	Leu	Ala	Gly	Leu	Asn	Leu	Phe	Leu	Thr	Gln	Pro	Val	Asn		
				405					410					415			
Gly	Val	Pro	Arg	Val	Asp	Phe	His	Trp	Lys	Phe	Val	Thr	His	Pro	Ile		
			420					425					430				
Ala	Ser	Asp	Asn	Phe	Tyr	Tyr	Pro	Gly	Tyr	Ala	Gly	Ile	Gly	Thr	Gln		
		435					440					445					
Leu	Gln	Asp	Ser	Glu	Asn	Glu	Leu	Pro	Pro	Glu	Ala	Thr	Gly	Gln	Pro		
	450					455					460						
Asn	Tyr	Glu	Ser	Tyr	Ser	His	Arg	Leu	Ser	His	Ile	Gly	Leu	Ile	Ser		
465					470					475				480			
Ala	Ser	His	Val	Lys	Ala	Leu	Val	Tyr	Ser	Trp	Thr	His	Arg	Ser	Ala		
				485					490					495			
Asp	Arg	Thr	Asn	Thr	Ile	Glu	Pro	Asn	Ser	Ile	Thr	Gln	Ile	Pro	Leu		
			500					505					510				
Val	Lys	Ala	Phe	Asn	Leu	Ser	Ser	Gly	Ala	Ala	Val	Val	Arg	Gly	Pro		
		515					520					525					
Gly	Phe	Thr	Gly	Gly	Asp	Ile	Leu	Arg	Arg	Thr	Asn	Thr	Gly	Thr	Phe		

530		535		540
Gly Asp Ile Arg Val Asn Ile Asn Pro Pro Phe Ala Gln Arg Tyr Arg				
545		550		555
Val Arg Ile Arg Tyr Ala Ser Thr Thr Asp Leu Gln Phe His Thr Ser				
	565		570	
Ile Asn Gly Lys Ala Ile Asn Gln Gly Asn Phe Ser Ala Thr Met Asn				
	580		585	
Arg Gly Glu Asp Leu Asp Tyr Lys Thr Phe Arg Thr Val Gly Phe Thr				
	595		600	
Thr Pro Phe Ser Phe Leu Asp Val Gln Ser Thr Phe Thr Ile Gly Ala				
	610		615	
Trp Asn Phe Ser Ser Gly Asn Glu Val Tyr Ile Asp Arg Ile Glu Phe				
625		630		635
Val Pro Val Glu Val Thr Tyr Glu Ala Glu Tyr Asp Phe Glu Lys Ala				
	645		650	
Gln Glu Lys Val Thr Ala Leu Phe Thr Ser Thr Asn Pro Arg Gly Leu				
	660		665	
Lys Thr Asp Val Lys Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val				
	675		680	
Glu Ser Leu Ser Asp Glu Phe Tyr Leu Asp Glu Lys Arg Glu Leu Phe				
	690		695	
Glu Ile Val Lys Tyr Ala Lys Gln Leu His Ile Glu Arg Asn Met				
705		710		715

<210> 11

<211> 1138

<212> PRT

<213> Bacillus thuringiensis

<400> 11

Met Asn Leu Asn Asn Leu Asp Gly Tyr Glu Asp Ser Asn Arg Thr Leu			
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Asn Asn Ser Leu Asn Tyr Pro Thr Gln Lys Ala Leu Ser Pro Ser Leu			
	20	25	30
Lys Asn Met Asn Tyr Gln Asp Phe Leu Ser Ile Thr Glu Arg Glu Gln			
	35	40	45
Pro Glu Ala Leu Ala Ser Gly Asn Thr Ala Ile Asn Thr Val Val Ser			
	50	55	60
Val Thr Gly Ala Thr Leu Ser Ala Leu Gly Val Pro Gly Ala Ser Phe			
65	70	75	80
Ile Thr Asn Phe Tyr Leu Lys Ile Ala Gly Leu Leu Trp Pro Glu Asn			
	85	90	95
Gly Lys Ile Trp Asp Glu Phe Met Thr Glu Val Glu Ala Leu Ile Asp			
	100	105	110
Gln Lys Ile Glu Glu Tyr Val Arg Asn Lys Ala Ile Ala Glu Leu Asp			
	115	120	125
Gly Leu Gly Ser Ala Leu Asp Lys Tyr Gln Lys Ala Leu Ala Asp Trp			
	130	135	140
Leu Gly Lys Gln Asp Asp Pro Glu Ala Ile Leu Ser Val Ala Thr Glu			
145	150	155	160
Phe Arg Ile Ile Asp Ser Leu Phe Glu Phe Ser Met Pro Ser Phe Lys			
	165	170	175
Val Thr Gly Tyr Glu Ile Pro Leu Leu Thr Val Tyr Ala Gln Ala Ala			
	180	185	190
Asn Leu His Leu Ala Leu Leu Arg Asp Ser Thr Leu Tyr Gly Asp Lys			
	195	200	205

Trp	Gly	Phe	Thr	Gln	Asn	Asn	Ile	Glu	Glu	Asn	Tyr	Asn	Arg	Gln	Lys
	210					215					220				
Lys	Arg	Ile	Ser	Glu	Tyr	Ser	Asp	His	Cys	Thr	Lys	Trp	Tyr	Asn	Ser
225					230					235					240
Gly	Leu	Ser	Arg	Leu	Asn	Gly	Ser	Thr	Tyr	Glu	Gln	Trp	Ile	Asn	Tyr
				245					250					255	
Asn	Arg	Phe	Arg	Arg	Glu	Met	Ile	Leu	Met	Ala	Leu	Asp	Leu	Val	Ala
			260					265					270		
Val	Phe	Pro	Phe	His	Asp	Pro	Arg	Arg	Tyr	Ser	Met	Glu	Thr	Ser	Thr
		275					280					285			
Gln	Leu	Thr	Arg	Glu	Val	Tyr	Thr	Asp	Pro	Val	Ser	Leu	Ser	Ile	Ser
290					295						300				
Asn	Pro	Asp	Ile	Gly	Pro	Ser	Phe	Ser	Gln	Met	Glu	Asn	Thr	Ala	Ile
305					310					315					320
Arg	Thr	Pro	His	Leu	Val	Asp	Tyr	Leu	Asp	Glu	Leu	Tyr	Ile	Tyr	Thr
				325					330					335	
Ser	Lys	Tyr	Lys	Ala	Phe	Ser	His	Glu	Ile	Gln	Pro	Asp	Leu	Phe	Tyr
			340					345					350		
Trp	Ser	Ala	His	Lys	Val	Ser	Phe	Lys	Lys	Ser	Glu	Gln	Ser	Asn	Leu
		355					360					365			
Tyr	Thr	Thr	Gly	Ile	Tyr	Gly	Lys	Thr	Ser	Gly	Tyr	Ile	Ser	Ser	Gly
	370					375					380				
Ala	Tyr	Ser	Phe	His	Gly	Asn	Asp	Ile	Tyr	Arg	Thr	Leu	Ala	Ala	Pro
385					390					395					400
Ser	Val	Val	Val	Tyr	Pro	Tyr	Thr	Gln	Asn	Tyr	Gly	Val	Glu	Gln	Val
				405					410					415	
Glu	Phe	Tyr	Gly	Val	Lys	Gly	His	Val	His	Tyr	Arg	Gly	Asp	Asn	Lys
			420					425					430		
Tyr	Asp	Leu	Thr	Tyr	Asp	Ser	Ile	Asp	Gln	Leu	Pro	Pro	Asp	Gly	Glu
	435						440					445			
Pro	Ile	His	Glu	Lys	Tyr	Thr	His	Arg	Leu	Cys	His	Ala	Thr	Ala	Ile
	450						455					460			
Phe	Lys	Ser	Thr	Pro	Asp	Tyr	Asp	Asn	Ala	Thr	Ile	Pro	Ile	Phe	Ser
465					470					475					480
Trp	Thr	His	Arg	Ser	Ala	Glu	Tyr	Tyr	Asn	Arg	Ile	Tyr	Pro	Asn	Lys
				485					490					495	
Ile	Thr	Lys	Ile	Pro	Ala	Val	Lys	Met	Tyr	Lys	Leu	Asp	Asp	Pro	Ser
			500					505					510		
Thr	Val	Val	Lys	Gly	Pro	Gly	Phe	Thr	Gly	Gly	Asp	Leu	Val	Lys	Arg
		515					520					525			
Gly	Ser	Thr	Gly	Tyr	Ile	Gly	Asp	Ile	Lys	Ala	Thr	Val	Asn	Ser	Pro
	530					535					540				
Leu	Ser	Gln	Lys	Tyr	Arg	Val	Arg	Val	Arg	Tyr	Ala	Thr	Asn	Val	Ser
545					550					555					560
Gly	Gln	Phe	Asn	Val	Tyr	Ile	Asn	Asp	Lys	Ile	Thr	Leu	Gln	Thr	Lys
				565					570					575	
Phe	Gln	Asn	Thr	Val	Glu	Thr	Ile	Gly	Glu	Gly	Lys	Asp	Leu	Thr	Tyr
			580					585					590		
Gly	Ser	Phe	Gly	Tyr	Ile	Glu	Tyr	Ser	Thr	Thr	Ile	Gln	Phe	Pro	Asp
		595					600					605			
Glu	His	Pro	Lys	Ile	Thr	Leu	His	Leu	Ser	Asp	Leu	Ser	Asn	Asn	Ser
	610					615					620				
Ser	Phe	Tyr	Val	Asp	Ser	Ile	Glu	Phe	Ile	Pro	Val	Asp	Val	Asn	Tyr
625					630					635					640
Ala	Glu	Lys	Glu	Lys	Leu	Glu	Lys	Ala	Gln	Lys	Ala	Val	Asn	Thr	Leu
				645					650					655	
Phe	Thr	Glu	Gly	Arg	Asn	Ala	Leu	Gln	Lys	Asp	Val	Thr	Asp	Tyr	Lys

Val	Asp	Gln	Val	Ser	Ile	Leu	Val	Asp	Cys	Ile	Ser	Gly	Asp	Leu	Tyr
		675						680					685		
Pro	Asn	Glu	Lys	Arg	Glu	Leu	Gln	Asn	Leu	Val	Lys	Tyr	Ala	Lys	Arg
		690						695					700		
Leu	Ser	Tyr	Ser	Arg	Asn	Leu	Leu	Leu	Asp	Pro	Thr	Phe	Asp	Ser	Ile
705					710					715					720
Asn	Ser	Ser	Glu	Glu	Asn	Gly	Trp	Tyr	Gly	Ser	Asn	Gly	Ile	Val	Ile
				725					730						735
Gly	Asn	Gly	Asp	Phe	Val	Phe	Lys	Gly	Asn	Tyr	Leu	Ile	Phe	Ser	Gly
			740					745					750		
Thr	Asn	Asp	Thr	Gln	Tyr	Pro	Thr	Tyr	Leu	Tyr	Gln	Lys	Ile	Asp	Glu
		755						760					765		
Ser	Lys	Leu	Lys	Glu	Tyr	Thr	Arg	Tyr	Lys	Leu	Lys	Gly	Phe	Ile	Glu
		770				775						780			
Ser	Ser	Gln	Asp	Leu	Glu	Ala	Tyr	Val	Ile	Arg	Tyr	Asp	Ala	Lys	His
785					790					795					800
Arg	Thr	Leu	Asp	Val	Ser	Asp	Asn	Leu	Leu	Pro	Asp	Ile	Leu	Pro	Glu
				805					810						815
Asn	Thr	Cys	Gly	Glu	Pro	Asn	Arg	Cys	Ala	Ala	Gln	Gln	Tyr	Leu	Asp
			820					825					830		
Glu	Asn	Pro	Ser	Pro	Glu	Cys	Ser	Ser	Met	Gln	Asp	Gly	Ile	Leu	Ser
		835					840					845			
Asp	Ser	His	Ser	Phe	Ser	Leu	Asn	Ile	Asp	Thr	Gly	Ser	Ile	Asn	His
		850				855					860				
Asn	Glu	Asn	Leu	Gly	Ile	Trp	Val	Leu	Phe	Lys	Ile	Ser	Thr	Leu	Glu
865					870					875					880
Gly	Tyr	Ala	Lys	Phe	Gly	Asn	Leu	Glu	Val	Ile	Glu	Asp	Gly	Pro	Val
				885					890						895
Ile	Gly	Glu	Ala	Leu	Ala	Arg	Val	Lys	Arg	Gln	Glu	Thr	Lys	Trp	Arg
			900					905					910		
Asn	Lys	Leu	Ala	Gln	Leu	Thr	Thr	Glu	Thr	Gln	Ala	Ile	Tyr	Thr	Arg
		915					920						925		
Ala	Lys	Gln	Ala	Leu	Asp	Asn	Leu	Phe	Ala	Asn	Ala	Gln	Asp	Ser	His
		930				935					940				
Leu	Lys	Arg	Asp	Val	Thr	Phe	Ala	Glu	Ile	Ala	Ala	Ala	Arg	Lys	Ile
945					950					955					960
Val	Gln	Ser	Ile	Arg	Glu	Ala	Tyr	Met	Ser	Trp	Leu	Ser	Val	Val	Pro
				965					970						975
Gly	Val	Asn	His	Pro	Ile	Phe	Thr	Glu	Leu	Ser	Gly	Arg	Val	Gln	Arg
			980					985					990		
Ala	Phe	Gln	Leu	Tyr	Asp	Val	Arg	Asn	Val	Val	Arg	Asn	Gly	Arg	Phe
		995				1000						1005			
Leu	Asn	Gly	Leu	Ser	Asp	Trp	Ile	Val	Thr	Ser	Asp	Val	Lys	Val	Gln
		1010				1015						1020			
Glu	Glu	Asn	Gly	Asn	Asn	Val	Leu	Val	Leu	Asn	Asn	Trp	Asp	Ala	Gln
1025					1030					1035					1040
Val	Leu	Gln	Asn	Val	Lys	Leu	Tyr	Gln	Asp	Arg	Gly	Tyr	Ile	Leu	His
				1045					1050						1055
Val	Thr	Ala	Arg	Lys	Ile	Gly	Ile	Gly	Glu	Gly	Tyr	Ile	Thr	Ile	Thr
			1060					1065					1070		
Asp	Glu	Glu	Gly	His	Thr	Asp	Gln	Leu	Arg	Phe	Thr	Ala	Cys	Glu	Glu
		1075					1080					1085			
Ile	Asp	Ala	Ser	Asn	Ala	Phe	Ile	Ser	Gly	Tyr	Ile	Thr	Lys	Glu	Leu
		1090				1095					1100				
Glu	Phe	Phe	Pro	Asp	Thr	Glu	Lys	Val	His	Ile	Glu	Ile	Gly	Glu	Thr
1105					1110					1115					1120

Glu Gly Ile Phe Leu Val Glu Ser Ile Glu Leu Phe Leu Met Glu Glu
1125 1130 1135
Leu Cys